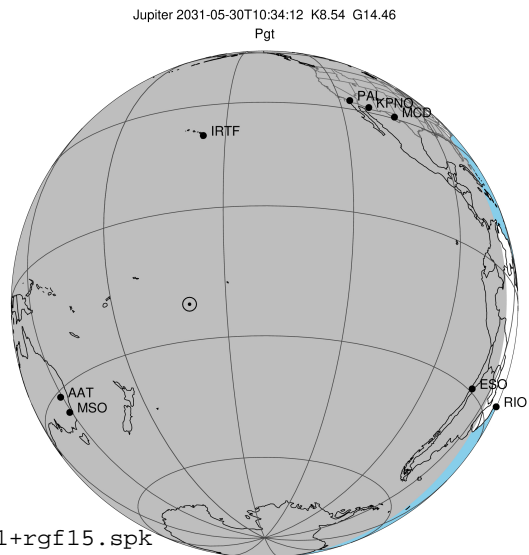


target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-05-30T10:34:12.860  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116553603058204288  
 2Mass ID (if available) : 17410332-2251531

Jupiter 2031-05-30T10:34:12 K8.54 G14.46 Pgt

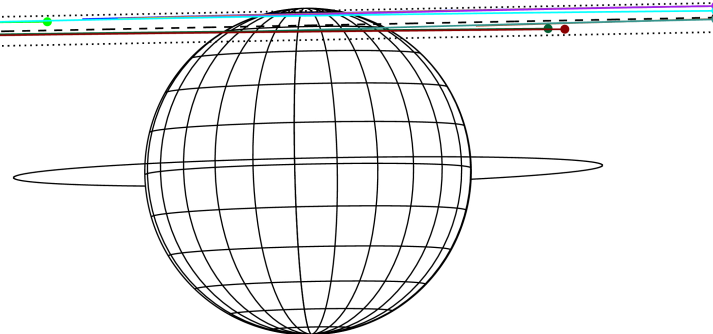
ICRS Star Coord at Epoch: 17h 41m 03.31312s -22:51:53.32939s

RUWE (>1.4 is poor) : 0.97  
 K magnitude : 8.544  
 G magnitude : 14.461  
 RP magnitude : 13.014  
 BP magnitude : 17.290  
 DUPflag : 0  
 Distance (au) : 4.309  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -15.13  
 Sun-Target sep (deg) : 162.77  
 Sun-Moon sep (deg) : 96.00  
 B (ring opening deg) : -2.61  
 PA of pole (deg) : 1.20  
 Pole direction: RA (deg): 268.05693  
 Dec (deg): 64.49651  
 C/A sky separation (") : 20.472  
 C/A sky separation (km) : 63980.9  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk



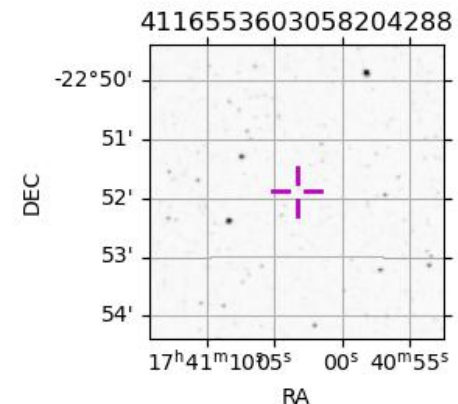
2031-05-30T10:34:12.8600 a: 17 41 03.3131 s: -22 51 53.3293 C/A \*\*\*\*\* PA 181.11 deg v\_sky -15.13 km/s D 04.31 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 RIO  
 ESO  
 AAT  
 MSO



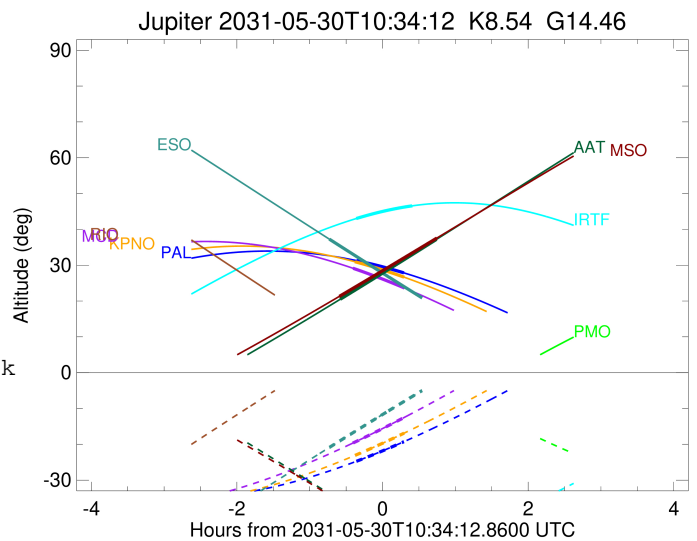
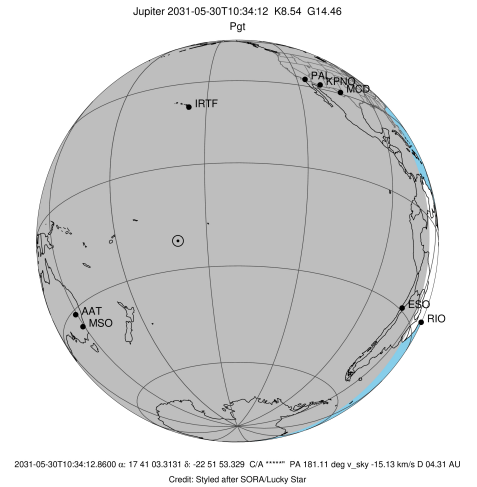
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+ +	MAY 30 10:12 - MAY 30 10:51	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	MAY 30 10:11 - MAY 30 10:52	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	MAY 30 10:10 - MAY 30 10:52	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	MAY 30 10:12 - MAY 30 10:58	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8			Pnn
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	MAY 30 09:50 - MAY 30 09:50	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	MAY 30 09:59 - MAY 30 11:18	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	MAY 30 09:58 - MAY 30 11:19	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-30T10:32:15.220
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : PAL
Location              : Palomar Mt (200")
Latitude (deg)        : 33.35622
E. Longitude (deg)    : 243.13601
Altitude (km)         : 1.706
Gaia source ID        : 4116553603058204288
2Mass ID (if available) : 17410332-2251531
ICRS Star Coord at Epoch: 17h 41m 03.31312s -22:51:53.32939s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 8.544
G magnitude           : 14.461
RP magnitude          : 13.014
BP magnitude          : 17.290
DUPflag              : 0
Distance (au)         : 4.309
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.13
Sun-Target sep (deg)  : 162.77
Sun-Moon sep (deg)   : 96.42
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.20
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (" ) : 22.120
C/A sky separation (km) : 69133.8
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

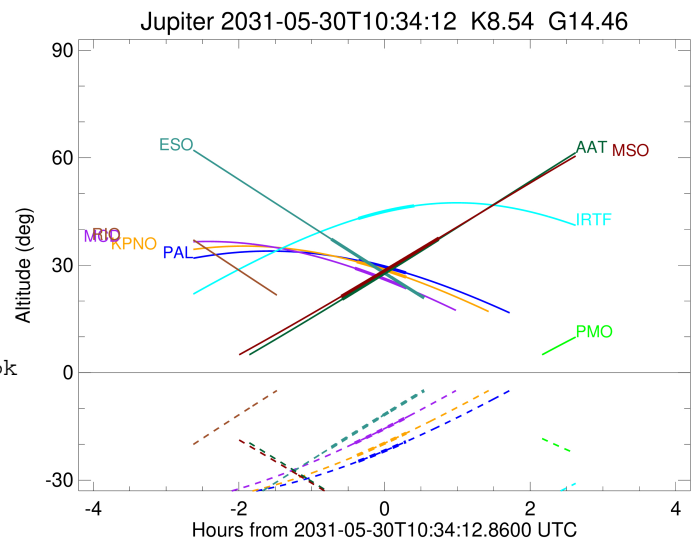
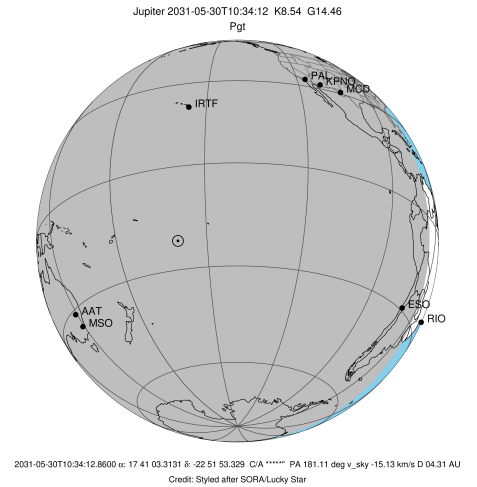


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-30T10:12:39.957	31.28	-24.74	71483.3	75.12	76.83
Jupiter	E	2031-05-30T10:51:51.275	27.85	-19.27	71483.3	74.92	76.64

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-30T10:31:47.830
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : KPNO
Location              : Kitt Peak Natl Obs
Latitude (deg)        : 31.96333
E. Longitude (deg)    : 248.40000
Altitude (km)         : 2.120
Gaia source ID        : 4116553603058204288
2Mass ID (if available) : 17410332-2251531
ICRS Star Coord at Epoch: 17h 41m 03.31312s -22:51:53.32939s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 8.544
G magnitude           : 14.461
RP magnitude          : 13.014
BP magnitude          : 17.290
DUPflag              : 0
Distance (au)         : 4.309
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.13
Sun-Target sep (deg) : 162.77
Sun-Moon sep (deg)   : 96.40
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.20
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 22.068
C/A sky separation (km): 68969.5
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

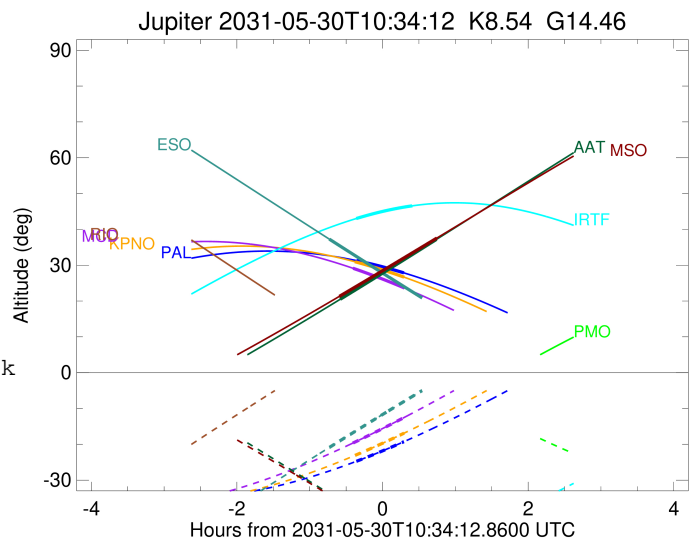
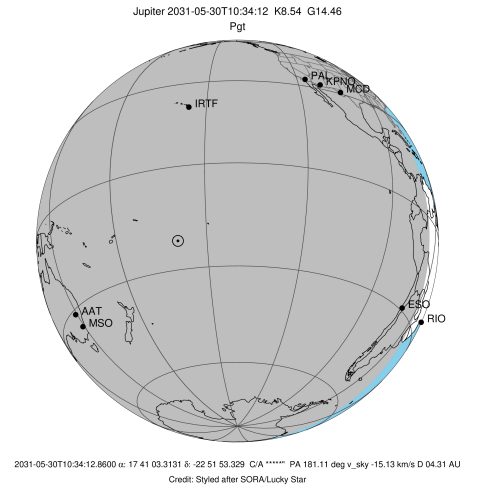


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-30T10:11:32.301	30.96	-23.09	71483.4	74.67	76.42
Jupiter	E	2031-05-30T10:52:04.453	26.65	-16.87	71483.4	74.37	76.15

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-30T10:31:10.810
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : MCD
Location             : McDonald Obs. 2.7m
Latitude (deg)       : 30.67158
E. Longitude (deg)   : 255.97844
Altitude (km)        : 2.075
Gaia source ID       : 4116553603058204288
2Mass ID (if available) : 17410332-2251531
ICRS Star Coord at Epoch: 17h 41m 03.31312s -22:51:53.32939s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 8.544
G magnitude           : 14.461
RP magnitude         : 13.014
BP magnitude         : 17.290
DUPflag              : 0
Distance (au)        : 4.309
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.13
Sun-Target sep (deg) : 162.77
Sun-Moon sep (deg)   : 96.35
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.20
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 21.996
C/A sky separation (km) : 68746.0
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

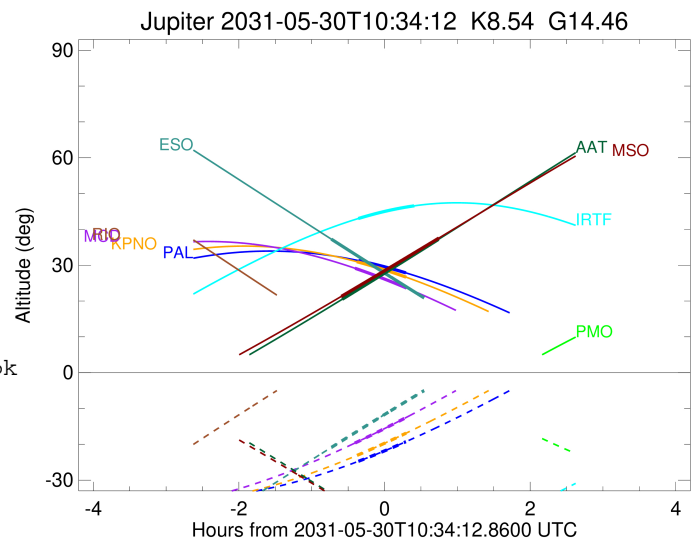
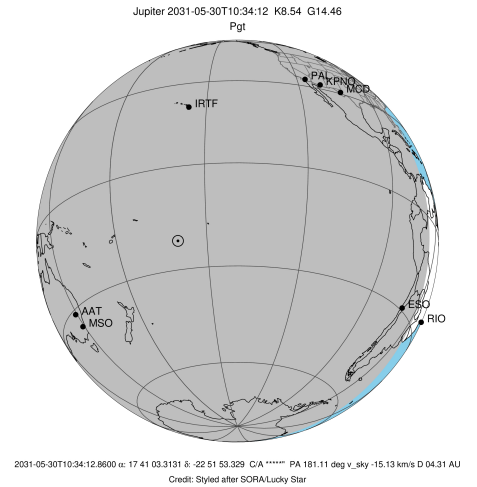


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-30T10:10:01.845	29.12	-19.61	71483.4	74.08	75.89
Jupiter	E	2031-05-30T10:52:21.294	23.63	-12.46	71483.4	73.65	75.50

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-30T10:35:42.620
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : IRTF
Location            : Mauna Kea/IRTF
Latitude (deg)      : 19.82622
E. Longitude (deg)  : 204.52800
Altitude (km)       : 4.168
Gaia source ID      : 4116553603058204288
2Mass ID (if available) : 17410332-2251531
ICRS Star Coord at Epoch: 17h 41m 03.31312s -22:51:53.32939s
RUWE (>1.4 is poor) : 0.97
K magnitude          : 8.544
G magnitude          : 14.461
RP magnitude         : 13.014
BP magnitude         : 17.290
DUPflag             : 0
Distance (au)       : 4.309
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.13
Sun-Target sep (deg) : 162.77
Sun-Moon sep (deg)  : 96.68
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.20
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 21.821
C/A sky separation (km) : 68198.8
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

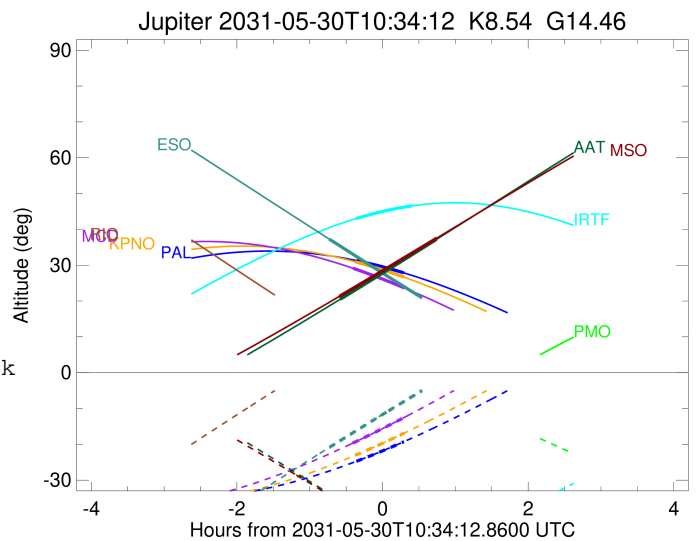
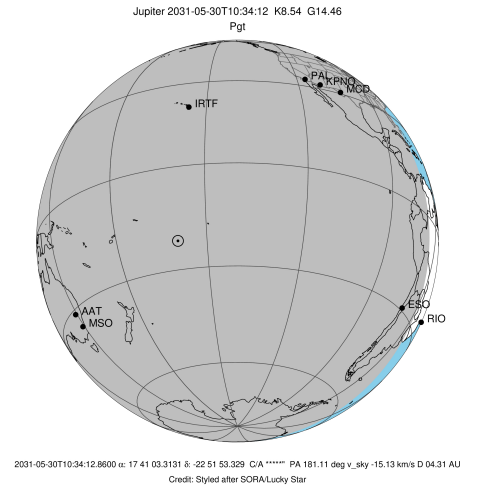


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-30T10:12:42.088	43.03	-48.50	71483.6	72.07	74.09
Jupiter	E	2031-05-30T10:58:41.973	46.56	-47.43	71483.5	72.62	74.58

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-30T10:29:06.740
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : ESO
Location              : European Southern Obs. (3.6m)
Latitude (deg)        : -29.26097
E. Longitude (deg)    : 289.26831
Altitude (km)         : 2.400
Gaia source ID        : 4116553603058204288
2Mass ID (if available) : 17410332-2251531
ICRS Star Coord at Epoch: 17h 41m 03.31312s -22:51:53.32939s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 8.544
G magnitude           : 14.461
RP magnitude          : 13.014
BP magnitude          : 17.290
DUPflag              : 0
Distance (au)         : 4.309
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.13
Sun-Target sep (deg)  : 162.77
Sun-Moon sep (deg)    : 96.35
B (ring opening deg) : -2.61
PA of pole (deg)      : 1.20
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 19.839
C/A sky separation (km) : 62002.1
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

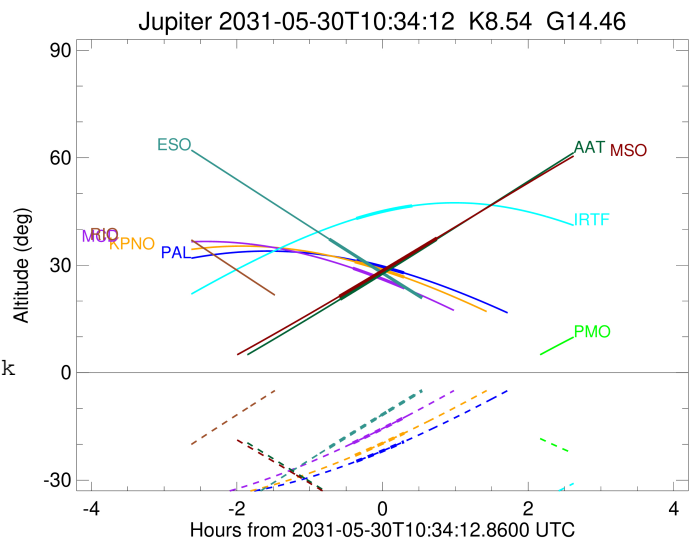
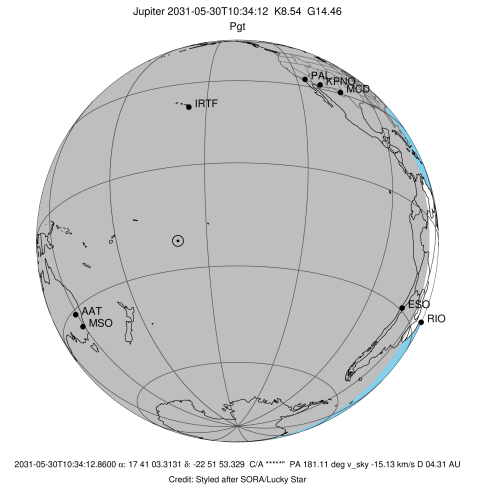


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-30T09:50:20.589	37.28	-20.88	71485.0	60.47	63.50
Jupiter	E	2031-05-30T11:08:01.678	20.62	-4.77x	71485.1	59.59	62.68

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-30T10:39:08.350
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : AAT
Location             : Siding Spring (AAT)
Latitude (deg)       : -31.27703
E. Longitude (deg)   : 149.06608
Altitude (km)        : 1.164
Gaia source ID       : 4116553603058204288
2Mass ID (if available) : 17410332-2251531
ICRS Star Coord at Epoch: 17h 41m 03.31312s -22:51:53.32939s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 8.544
G magnitude           : 14.461
RP magnitude          : 13.014
BP magnitude          : 17.290
DUPflag              : 0
Distance (au)         : 4.309
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.13
Sun-Target sep (deg) : 162.77
Sun-Moon sep (deg)   : 96.52
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.20
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 19.718
C/A sky separation (km) : 61624.5
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

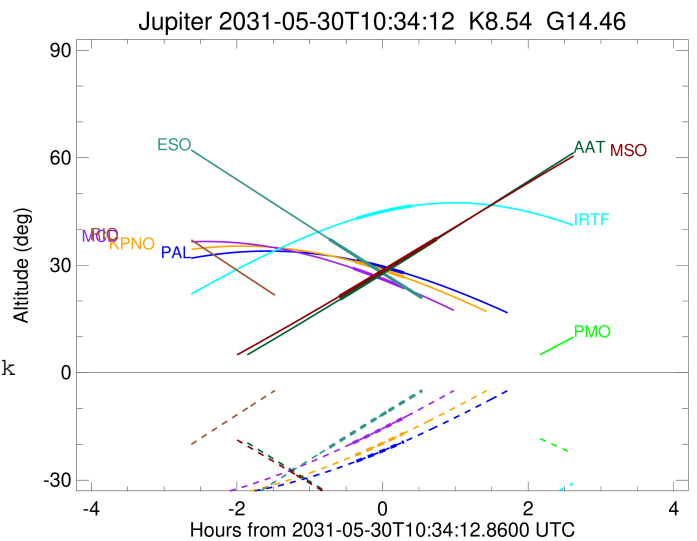
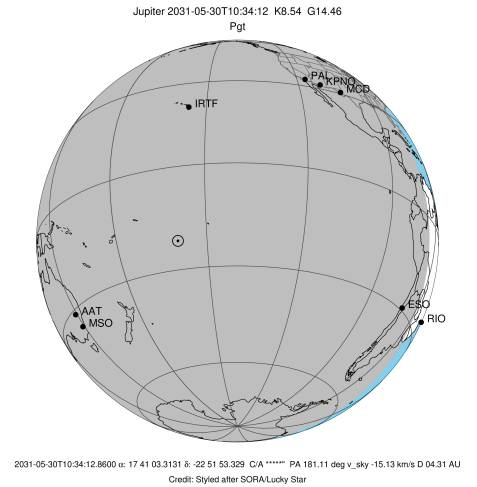


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-30T09:59:28.772	20.51	-35.72	71485.2	58.79	61.93
Jupiter	E	2031-05-30T11:18:37.645	37.19	-52.63	71485.0	60.07	63.13

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-30T10:38:54.910
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : MSO
Location             : Mt. Stromlo Observatory
Latitude (deg)       : -35.32000
E. Longitude (deg)   : 149.00833
Altitude (km)        : 0.770
Gaia source ID       : 4116553603058204288
2Mass ID (if available) : 17410332-2251531
ICRS Star Coord at Epoch: 17h 41m 03.31312s -22:51:53.32939s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 8.544
G magnitude           : 14.461
RP magnitude          : 13.014
BP magnitude          : 17.290
DUPflag              : 0
Distance (au)         : 4.309
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.13
Sun-Target sep (deg) : 162.77
Sun-Moon sep (deg)   : 96.53
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.20
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 19.596
C/A sky separation (km) : 61244.9
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```



x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-30T09:58:32.502	21.27	-35.78	71485.3	58.22	61.40
Jupiter	E	2031-05-30T11:19:07.125	37.59	-52.20	71485.1	59.46	62.56